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A sketch of the flora of Orono, Me.

F. LAMSON—SCRIBNER.

[The writer desires to have the facts embodied in the following paper, prepared in 1872 and hitherto unpublished, placed on record for the use of those who may hereafter compile the flora of Maine.]

An account of the flora of any region is valuable as indicating the local distribution of plants—a matter of much interest to the botanist and agriculturist. The geographical range of species is thus established. A knowledge of the plants of a locality enables one to form a very correct opinion of its climate and the nature and condition of the soil. On the other hand, the climate and physical features of a locality form an index to the variety and nature of the plants which may there be found. The extreme northeastern position of this locality renders it of more than ordinary interest.

The physical characters of this region are such as to afford a large number of species, and I very much regret that the list here presented is a so meager. It is to be hoped that the work thus begun will be rapidly advanced by the students of the College, in order that we may soon possess a complete list of the Phanerogams and Vascular Cryptogams of this entire region. The Mosses and Lichens have not yet been worked up. Of these lower, yet vastly interesting families this section certainly presents a rich field. Future researches will not only add much to our knowledge of those species already observed, but largely increase the list now made.

Almost every variety and condition of soil found in our latitude—except that of the seashore and high mountains—is to be met with here. The Stillwater branch of the Penobscot river flows close by the College front, and a mile in the opposite direction flow the rapid waters of the main river. Species delighting in sandy and rocky river banks find along these waters congenial homes. There are extensive meadows and upland glades; numerous streams of varied character; deep sphagnous and grassy swamps of larch, spruce and cedar. There are high rocky deciduous woods; steep gravelly hills and sandy fields; several ponds or lakes with both sandy and muddy shores, and an almost unlimited extent of mossy bog-land.

With all these varied conditions one may reasonably expect an extensive and interesting flora. Only a small portion of this territory has been thoroughly examined, and no

one locality visited throughout the entire season. The blooms of the month of August have been but partially observed, that being the month of the summer vacation. It has been my good fortune to examine the floras of Manchester and Waterville of this State; as compared with these the region of Orono and vicinity is much more interesting botanically, being peculiarly rich in rare and local species. Several localities, visited but once or twice, have appeared very interesting, and may, when more thoroughly explored, yield many rare and pleasing species.

Such a locality is the one near Pushaw mills, on the river about two miles above Stillwater village. This place was visited in June, last season, and we were rewarded by finding several species new to our list, one of rare interest. The water at this place rushes rapidly over a rocky bed, and the west bank is formed by a high precipitous cliff, on which specimens of the Sand Cherry (*Prunus pumila* L.) were found. This, our smallest species of the cherry tribe, is a little trailing shrub growing over the sand and rocks, rarely attaining the height of sixteen inches. Growing in abundance close by the bank were *Aquilegia Canadensis* L., *Potentilla tridentata* Ait., and the small purple *Houstonia* (*H. purpurea* L., var. *longifolia* Willd.). Out from the perpendicular walls of the cliff there was growing a pretty little fern, which was too immature for identification. But the chief interest of this locality is that it produces *Arabis Drummondii* Gray, the upright slender stems standing out from the bare rock walls, wherever there is a possibility for its fibrous roots to penetrate and find foot-hold. This is a rare, and, on account of its pale glaucous leaves and rose white flowers, a very attractive Crucifer. Although uncommon, this species has a wide geographical range, extending from Maine to Oregon. *Astragalus alpinus* L., an exceedingly pretty leguminous plant which grows on a small rocky island in the Kennebec river opposite Waterville, may be looked for here. Coming back to the College from the place we have just been describing I found numerous specimens of *Carex Houghtonii* Torr., growing on the grading of the Orono and Stillwater Railroad near the town bridge at the last named place. The Rev. J. Blake has collected this *Carex* at Medford. Another locality which has been visited but once (July 1870) is Nickol's Stream which flows through an extensive bog and forms the outlet of a pond of the same name in the town of Bradley.

The plants which characterize the place, as observed upon one hasty trip, are *Lycopodium inundatum* L., *Eriophorum alpinum* L., *Limnanthemum lacunosum* Griseb., *Carex rostrata* Mx., and *Spartina cynosuroides* Willd. This last species was found just by the outlet of the pond. The *Lycopodium* is a dwarf species from one to three inches high. It was growing on muddy soil close by the waters of the stream. Last season I found the same species growing on a bog in Manchester. It is quite rare, and valuable for exchanges. The enthusiastic student would be well repaid by a visit to this stream.

An excursion was made to Pushaw Lake in June, 1870, and the following species noted: *Lobelia Dortmanna* L., *Nuphar luteum* Smith, var. *pumilum*, *Pontederia cordata* L., *Brasenia peltata* Pursh., *Eriocaulon septangulare* With. Near the lake, *Potentilla palustris* Scop. was found in abundance. Along the way to the lake specimens of *Smilacina trifolia* Desf. and *Phalaris arundinacea* were collected.

About three miles southwest from Orono village there is a large bog, where are found nearly all the plants common to such localities. The main road from Stillwater to Bangor passes through this, making it easy of access. From here most of the bog plants of the College herbarium were obtained. The last of April or early in May we go to this locality for *Symplocarpus fœtidus* Salisb., *Cassandra calyculata* Don, and *Andromeda polifolia* L. It is here too that we find the *Lonicera cœrulea* L. and later in the season *Arethusa bulbosa* L., *Calopogon pulchellus* R. Br., *Pogonia ophioglossoides* Nutt. and *Habenaria blephariglottis* Lindl., four of our prettiest Orchids. The Pitcher Plant (*Sarracenia*) luxuriates here in the damp *Sphagnum*, opening its odd flowers with deep purple, fiddle-shaped petals and umbrella-like style, about the middle of June. Among the species of this bog we mention the species of *Osmunda* and *Eriophorum*, *Menyanthes trifoliata* L., *Carex pauciflora* Lghft., *C. chordorhiza* Ehrh., *C. lacustris* Willd., and many other species of *Cyperaceæ*.

In the woods which lie in a direct line from the College to the bog here spoken of, known as Bennock's woods, there were collected last summer (1873) many specimens of *Calypso borealis* Salisb., a rare and most beautiful Orchid. In one small spot, not more than 2 feet square, the writer observed nearly one hundred specimens in full bloom! A more pleasing or beautiful sight can hardly be imagined. A few specimens of the *Calypso* have been found in the swamp east of

the Colleges. It has also been seen in considerable numbers in the woods opposite the "Trotting Park." In Bennock's woods above mentioned, I gathered in 1871 a number of specimens of *Botrychium simplex* Hitch. In 1870 this plant was observed in the low fields between the house formerly occupied by Prof. Peckham, and the river.

An exceedingly rich and interesting locality, botanically considered, is the region below Basin Mills, extending down by the river and along the railroad for two or three miles. Here we find a great variety in the nature and condition of the soil, producing many species. Upon a high and gravelly bank less than half a mile below the Basin, near John McPheter's brook, grows a rare and elegant vine, *Clematis verticillaris* DC. It is a more delicate plant and prefers a drier soil than its near relative, *C. Virginiana* L. It is by far the prettier species, however; in fact it well deserves to stand first, as regards ornament, among our native climbers. The showy bluish purple petals of the flower expand two or three inches. It blooms from the middle to the last of May. The flowers are followed by the rather pretty plumose fruit. It is easily cultivated and is worthy a place among our handsomest foreign vines. By the rocky bank of a railroad cut, perhaps two miles below the mills, we find another beautiful native climber, called Wax-work or Bittersweet, *Celastrus scandens*. It receives its first name on account of the waxy aspect of the fruit, which in autumn presents a most brilliant appearance. Near where the Bittersweet grows there is found an abundance of the bright *Saxifraga Virginensis*. Along by the railroad we find the pretty *Corydalis glauca*. Near the railroad there is a bog-marsh where delights the *Calla palustris*. Upon the bog we find *Carex irrigua*, one of the most attractive of the Carices.

About a mile below the mills there is a slow muddy stream where grows *Nuphar advena*. In a thicket close by this stream we find rather an uncommon species of *Trillium* (*T. recurvum*), which conceals its white or sometimes pinkish flower beneath its trio of leaves. Upon the dry banks near by *Pedicularis Canadensis* abounds, with its long, finely cut leaves, which are often of a deep purple color, and very handsome. Two miles, or perhaps two and a half miles below the mills, there is a rich marshy spot where in May we are attracted by the bright golden flowers of *Calla palustris*. This is also the locality of *Thaspium aureum* and *Archangelica atropurpur-*

ea. On the shaded banks near at hand grow the large yellow *Viola pubescens* and *Thalictrum dioicum* L. Just below the mills in early spring may be observed the large coarse plaited leaves of *Veratrum viride* Ait. This locality also contains *Nemopanthes Canadensis*, *Cassandra calyculata*, *Rhodora Canadensis*, *Ledum latifolium*, *Kalmia glauca* and *K. latifolia*.

On the island at Basin Mills *Arctostaphylos Uva-ursi* Spreng., *Houstonia purpurea*, var. *longifolia* Gray, and *Oryzopsis Canadensis* may be found. *Veronica Buxbaumii* Tenore was collected on the high bank between Orono village and Basin Mills, just above "Cold Spring."

In a swamp in Bradley on the left hand side of the road going to Nickol's Stream, grows the most showy and beautiful of the Lady's Slippers, *Cypripedium spectabile*. With this *Cypripedium* are found *Habenaria hyperborea* and *Listera cordata*. The latter delicate and inconspicuous little orchid also abounds in the swamp just east of the College.

We now come to consider a few of the more interesting plants found immediately about the College. The Calypso has already been alluded to as having been observed near here. In the field in the rear of the new barn, specimens of *Ophioglossum vulgatum* were gathered in 1872. In the clearing in the same direction *Nardosmia palmata* grows in great abundance. I have observed this plant growing sparingly in Manchester. Dr. Goodale speaks of its being common in swamps near the Canada line on the "Canada Road." It is by no means a rare plant in this neighborhood. In some places it is as abundant as *Erechthites* on newly burnt land. This plant blooms the first of May, and is quite a puzzle for beginners, not only on account of its Composite character, but because the palmate leaves (whence the specific name) do not appear till late in the season.

Specimens of *Aralia quinquefolia* have been collected in the woods near the "Trotting Park." *Vaccinium Canadensis* Kalm abounds just east of the College. It is distinguished by its low growth and pubescent leaves, better known, however, by its rich, sweet berries. The following Orchids are found in the woods back of the College: *Habenaria Hookeri* Torr., *H. orbiculata* Torr., *Spiranthes cernua* Rich., *S. gracilis* Big., *Corallorhiza innata* R. Br., *C. multiflora* Nutt., *Goodyera repens* R. Br., *G. pubescens*, R. Br., *Listera cordata* R. Br., *Calypso borealis* Salisb., *Cypripedium parviflorum* Salisb., *C. acaule* Ait

The kinds of trees composing these woods are hemlock, fir, spruce, poplar, pine, maple, birch, beech, etc. The woods about the College are thus of a mixed growth, coniferous trees and soft wood predominating. The forests west and north on rocky uplands have more hard wood species. The forests are all second growth and none of the trees are of large size. Hard woods suitable for lumbering purposes are very scarce. The same is true of pine. The sugar maple occurs, but not in sufficient abundance to make sugar-making a paying business.

Acer dasycarpum Ehrh. grows along the banks of the river between Stillwater and Orono villages. It is a tree of large growth and often maintains a majestic, if not a magnificent appearance. It is distinguished from *A. rubrum* L. by the silvery whiteness of the under surface of the leaves, whence the trivial name. The branches are large and gradually expanding as they ascend, often becoming recurved somewhat in the manner of the elm. The wood is soft and fine grained, of moderate strength and perishable.

By the river in front of the College we find *Viola lanceolata* and *Ranunculus Flammula*, var. *reptans*. *Potentilla palustris* and *Campanula aparinoides* are found in the meadow below the farm house. On the side of the river opposite from the farm house there grow two very attractive vines, *Calyptegia sepium* and *Apios tuberosa*. During the past season there was found along this bank the noble Ostrich Fern (*Struthiopteris Germanica* Willd.).

The variety of grasses upon the farm are those of common occurrence though there is a greater predominance of the better sorts. The bits of swale land, which are few, contain the ordinary sedges and species of *Glyceria*. The chief grasses which form the hay crop are timothy and red top with occasional plants of brown top or fowl meadow grass. With this hay there is mixed a small proportion of several kinds of clover. The forage plants which have been introduced by the present farm Superintendent are Hungarian millet and Alsike clover.

There are but few weeds found in Maine which have not been observed growing upon the College premises. Last season there was detected in a grain field a weed which the writer at least had not before observed, viz.: *Camelina sativa* Crantz. Darlington says this plant was introduced with flax, and remains as weed where the culture of that plant has been

abandoned. There is much danger of new weeds being introduced with the seeds or roots of plants received upon the farm from the Patent Office and elsewhere. Those weeds which give the most trouble are barn grass, rag-weed, purslane and couch or witch grass. The number of species in the College herbarium is 316, representing 66 orders. This does not include several species undetermined, nor the Compositæ, Salices, Juncaceæ, Cyperaceæ, and Gramineæ, and only a portion of the higher Cryptogams. The actual number of species observed, aside from the families mentioned, is 455.

Orono, Maine, 1872.

BRIEFER ARTICLES.

Notes on the pollination of *Helianthus*.—Having had growing in my room for some months a specimen of *Helianthus annuus*, I have observed its habits closely to see if I could find something new or interesting. Nothing out of the ordinary was observed until it came to bloom, which it did in March, bearing a single head. During this period I observed it very closely, from the time of the opening of the first disk floret until the last had withered away. Most of the flowers behaved in the usual way, the style pushing out the pollen from the stamen tubes and cross-fertilization was insured by protandry. But in a number I noticed movements, to me quite new and interesting.

The styles in these cases appeared as usual and soon spread their tips for the reception of pollen. After standing in this way for about two days I was greatly surprised to see that they were being drawn back into the stamen tube. This they continued to do until they finally disappeared. Then the stems were forced to one side and from between the filaments were seen the bent styles slowly backing out, resembling very much the extraction of the plumule from the acorn in germination. This it continued to do until the entire style was withdrawn, leaving the stamens wilted and collapsed lying upon the limb of the corolla. Then the style assumed an erect position, spread its tips and apparently stood waiting to receive pollen. This entire act was accomplished in about a dozen cases; failed to more than draw back into the stamen tube in about as many more; and in two the style was broken in attempting to escape. All this was observed only in the outer circle of tubular flowers, which preceded the others by about four days.